

(12) United States Patent Wong et al.

(10) Patent No.:

US 6,369,116 B1

(45) Date of Patent:

Apr. 9, 2002

#### COMPOSITION AND METHOD FOR TREATING GLAUCOMA

- Inventors: Vernon Wong, Menlo Park; Lin Peng, San Jose, both of CA (US)
- Assignee: Oculex Pharmaceuticals, Inc., Sunnyvale, CA (US)
- (\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.
- (21) Appl. No.: 09/221,002 (22) Filed: Dec. 23, 1998

#### Related U.S. Application Data

- Continuation of application No. 09/160,635, filed on Sep. 24, 1998, which is a continuation of application No. 08/459, 134, filed on Jun. 2, 1995, now Pat. No. 5,869,079.
- Int. Cl.<sup>7</sup> ..... ..... A01N 43/38 U.S. Cl. ..... 514/913; 424/486; 424/488 (52)
- Field of Search ...... 424/484, 486, (58)424/488; 514/944, 913

#### (56)References Cited

#### U.S. PATENT DOCUMENTS

4,478,818 A	10/1984	Shell et al 424/14
4,863,457 A	• 9/1989	Lee
4,865,846 A	• 9/1989	Kaufman
4,997,652 A	3/1991	Wong 424/428
5,075,115 A	12/1991	Brine 424/486
5,164,188 A	11/1992	Wong 424/428
5,268,178 A	* 12/1993	Calhoun et al.
5,356,629 A	10/1994	Sander et al 424/422
5,385,887 A	1/1995	Yim et al 514/12
5,501,856 A	3/1996	Ohtori et al 424/428
5,656,297 A	* 8/1997	Bernstein et al.
5,707,643 A	* 1/1998	Ogura

### OTHER PUBLICATIONS

R. Baker, "Controlled Release of Biologically Active Agents," A Wiley-Interscience Publication, p. 73 (1987). G. DiColo, "Controlled drug release from implantable matrices based on hydrophobic polymers," Biomaterials 1992, vol. 13, No. 12:850-853.

T. Jackanicz et al, "Polylactic Acid As A Biodegradable Carrier For Contraceptive Steroids," Contraception, vol. 8, No. 3:227-235.

R. Miller et al, "Degradation Rates of Oral Resorbable Implants (Polylactates and Polyglycolates): Rate Modification with Changes in PLA/PGA Copolymer Ratios," J. Biomed. Mater. Res., vol. 11:711-719 (1977).

J. Heller, "Biodegradable Polymers in Controlled Drug Delivery," CRC Critical Reviews in Therapeutic Drug Carrier Systems, vol. 1, Issue 1:39-90.

J. Charles, et al, "Use of Biocrodible Polymers Impregnated with Mitomycin in Glaucoma Filtration Surgery in Rabbits,' Ophthalmology, Apr. 1991, vol. 98, No. 4: 503-508.

H. Jampel, et al, "Glaucoma Filtration Surgery in Monkeys Using 5-Fluorouridine in Polyanhydride Disks," Arch Ophthalmol, Mar. 1990, vol. 108:430-435.

D. Lee, et al, "The Use of Bioerodible Polymers and 5-Fluorouracil in Glaucoma Filtration Surgery," Investigative Ophthalmology & Visual Science, Nov. 1988, vol. 29, No. 11:1692-1697.

M. Chang, et al, "Basic Science and Clinical Aspects of Wound Healing in Glaucoma Filtering Surgery," Journal of Ocular Pharmacology and Therapeutics, 1998, vol. 14, No.

D. Lee, et al, "Glaucoma Filtration Surgery in Rabbits Using Bioerodible Polymers and 5-Fluorouracil," Ophthalomology, Dec. 1987, vol. 94, No. 12:1523-1530.

T. Smith, et al, "Sustained-release subconjunctival 5-Fluorouracil," Ophthalmic Surgery Lasers, Sep. 1996, vol. 27, No. 9:763-767.

## \* cited by examiner

Primary Examiner-Edward J. Webman (74) Attorney, Agent, or Firm—David J. Brezner; Todd A. Lorenz; Flehr Hohbach Test Albritton & Herbert LLP

Implants and methods are provided for modulating wound healing and controlling infection to improve the success of glaucoma filtration surgery. Formulations of one or more therapeutically active agents and a biodegradable polymer provide a substantially constant rate of release for an extended period of time.

# 19 Claims, 5 Drawing Sheets



